

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims

1. (Currently amended) A method comprising:

receiving an I/O command at a switch from a host;

if the I/O command is a write I/O, then writing data via the switch to a primary storage subsystem and a secondary storage subsystem, wherein the switch couples the host to the primary storage subsystem and the secondary storage subsystem, and wherein the data written to the primary storage subsystem and the data written to the secondary storage subsystem are the same;

receiving an indication of a failure of the primary storage subsystem at the switch; and subsequently, directing a command from the host received at the switch to the secondary storage subsystem for completion by changing a source volume and a target volume in the command to correspond to volumes in the secondary storage subsystem, wherein the source volume and the target volume are for I/O operations, and wherein the changing is performed by a switching application in the switch, wherein a hardware unit is coupled to the primary storage subsystem, wherein the hardware unit traps alerts related to I/O failures and notifies the switch to perform the changing, and wherein in response to the hardware unit receiving a notification that the primary storage subsystem is fixed creating a copy of secondary storage subsystem data to guard against any subsequent failure during resynchronization of the primary and secondary storage systems.

2. (Canceled)

3. (Currently amended) The method of claim 31, wherein the notification is a first notification, the method further comprising:

receiving a second notification at the switch from a monitor application that traps an I/O alert corresponding to the failure, wherein the monitor application is coupled to [[a]] the hardware unit coupled to the primary storage subsystem; and

holding an I/O request that resulted in the failure in a busy state at the monitor application.

4. (Currently amended) The method of claim 31, wherein the notification is a first notification, the method further comprising:

receiving a second notification at a monitor application that the primary storage subsystem is functioning properly, wherein the monitor application is coupled to [[a]] the hardware unit coupled to the primary storage subsystem; and

synchronizing data in the secondary storage subsystem to the primary storage subsystem; and

directing a command from the host received at the switch to the primary storage subsystem for completion.

5-10. (Canceled)

11. (Currently amended) A system comprising:

a primary storage subsystem;

a secondary subsystem;

a switch, wherein the switch couples a host to the primary storage subsystem and the secondary storage subsystem;

means for receiving an I/O command at a switch from a host;

means for writing data via the switch to the primary storage subsystem and the secondary storage subsystem if the I/O command is a write I/O, and wherein the data written to the primary storage subsystem and the data written to the secondary storage subsystem are the same;

means for receiving an indication of a failure of the primary storage subsystem at the switch; and

means for directing a command from the host received at the switch to the secondary storage subsystem for completion, by changing a source volume and a target volume in the command to correspond to volumes in the secondary storage subsystem, wherein the source volume and the target volume are for I/O operations, and wherein the changing is performed by a switching application in the switch, wherein a hardware unit is coupled to the primary storage subsystem, wherein the hardware unit traps alerts related to I/O failures and notifies the switch to perform the changing, and wherein in response to the hardware unit receiving a notification that

the primary storage subsystem is fixed creating a copy of secondary storage subsystem data to guard against any subsequent failure during resynchronization of the primary and secondary storage systems.

12. (Canceled)

13. (Currently amended) The system of claim 35, wherein the notification is a first notification, the system further comprising:

means for receiving a second notification at the switch from a monitor application that traps an I/O alert corresponding to the failure, wherein the monitor application is coupled to [[a]] the hardware unit coupled to the primary storage subsystem; and

means for holding an I/O request that resulted in the failure in a busy state at the monitor application.

14. (Currently amended) The system of claim 35, wherein the notification is a first notification, the system further comprising:

a hardware unit coupled to the primary storage subsystem;

a monitor application coupled to the hardware unit;

means for receiving a second notification at the monitor application that the primary storage subsystem is functioning properly; and

means for synchronizing data in the secondary storage subsystem to the primary storage subsystem; and

means for directing a command from the host received at the switch to the primary storage subsystem for completion.

15 – 20. (Canceled)

21. (Currently amended) A computer readable storage medium including code, wherein the code in response to being executed by a processor is capable of causing operations, the operations comprising:

receiving an I/O command at a switch from a host;

if the I/O command is a write I/O, then writing data via the switch to a primary storage subsystem and a secondary storage subsystem, wherein the switch couples the host to the primary storage subsystem and the secondary storage subsystem, and wherein the data written to the primary storage subsystem and the data written to the secondary storage subsystem are the same;

receiving an indication of a failure of the primary storage subsystem at the switch; and subsequently, directing a command from the host received at the switch to the secondary storage subsystem for completion by changing a source volume and a target volume in the command to correspond to volumes in the secondary storage subsystem, wherein the source volume and the target volume are for I/O operations, and wherein the changing is performed by a switching application in the switch, wherein a hardware unit is coupled to the primary storage subsystem, wherein the hardware unit traps alerts related to I/O failures and notifies the switch to perform the changing, and wherein in response to the hardware unit receiving a notification that the primary storage subsystem is fixed creating a copy of secondary storage subsystem data to guard against any subsequent failure during resynchronization of the primary and secondary storage systems.

22. (Canceled)

23. (Currently amended) The computer readable storage medium of claim 39, wherein the notification is a first notification, the operations further comprising:
receiving a second notification at the switch from a monitor application that traps an I/O alert corresponding to the failure, wherein the monitor application is coupled to [[a]] the hardware unit coupled to the primary storage subsystem; and
holding an I/O request that resulted in the failure in a busy state at the monitor application.

24. (Currently amended) The computer readable storage medium of claim 39, wherein the notification is a first notification, the operations further comprising:

receiving a second notification at a monitor application that the primary storage subsystem is functioning properly, wherein the monitor application is coupled to [[a]] the hardware unit coupled to the primary storage subsystem; and

synchronizing data in the secondary storage subsystem to the primary storage subsystem; and

directing a command from the host received at the switch to the primary storage subsystem for completion.

25-30. (Canceled)

31. (Previously presented) The method of claim 1, wherein the switch is an I/O switch implemented in a fibre channel mechanism.

32. (Previously presented) The method of claim 4, wherein the primary storage subsystem and the secondary storage subsystem comprise a plurality of logical storage units, and wherein if the I/O command is a read I/O, then reading the data from the primary storage subsystem.

33. (Previously presented) The method of claim 32, further comprising:
determining if the switching application in the switch is in an asynchronous mode;
if the switching application is in an asynchronous mode, then:

(i) writing the data to the primary storage subsystem;

(ii) writing the data to a buffer in the switch; and

(iii) copying the data from the switch to the secondary storage subsystem;

determining if the switching application in the switch is in a synchronous mode; and
if the switching application is in a synchronous mode, then writing the data to the primary storage subsystem and the secondary storage subsystem substantially simultaneously.

34. (Previously presented) The method of claim 33, wherein the secondary storage subsystem maintains a bitmap that is available for data replication when resynchronization of the

data is required between secondary storage subsystem and the primary storage subsystem whose failure was indicated earlier.

35. (Previously presented) The system of claim 11, wherein the switch is an I/O switch implemented in a fibre channel mechanism.

36. (Previously presented) The system of claim 14, wherein the primary storage subsystem and the secondary storage subsystem comprise a plurality of logical storage units, and wherein if the I/O command is a read I/O, then reading the data from the primary storage subsystem.

37. (Previously presented) The system of claim 36, further comprising:
means for determining if the switching application in the switch is in an asynchronous mode, wherein if the switching application is in an asynchronous mode, then:

- (i) writing the data to the primary storage subsystem;
- (ii) writing the data to a buffer in the switch; and
- (iii) copying the data from the switch to the secondary storage subsystem; and

means for determining if the switching application in the switch is in a synchronous mode, wherein if the switching application is in a synchronous mode, then writing the data to the primary storage subsystem and the secondary storage subsystem substantially simultaneously.

38. (Previously presented) The system of claim 37, wherein the secondary storage subsystem maintains a bitmap that is available for data replication when resynchronization of the data is required between secondary storage subsystem and the primary storage subsystem whose failure was indicated earlier.

39. (Previously presented) The computer readable storage medium of claim 21, wherein the switch is an I/O switch implemented in a fibre channel mechanism.

40. (Previously presented) The computer readable storage medium of claim 24, wherein the primary storage subsystem and the secondary storage subsystem comprise a plurality of

logical storage units, and wherein if the I/O command is a read I/O, then reading the data from the primary storage subsystem.

41. (Previously presented) The computer readable storage medium of claim 40, further comprising:

determining if the switching application in the switch is in an asynchronous mode;

if the switching application is in an asynchronous mode, then:

(i) writing the data to the primary storage subsystem;

(ii) writing the data to a buffer in the switch; and

(iii) copying the data from the switch to the secondary storage subsystem;

determining if the switching application in the switch is in a synchronous mode; and

if the switching application is in a synchronous mode, then writing the data to the primary storage subsystem and the secondary storage subsystem substantially simultaneously.

42. (Previously presented) The computer readable storage medium of claim 41, wherein the secondary storage subsystem maintains a bitmap that is available for data replication when resynchronization of the data is required between secondary storage subsystem and the primary storage subsystem whose failure was indicated earlier.